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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/801,392

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Ajay Garg

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EXAMINER

ZHE, MENG YAO

ART UNIT

PAPER NUMBER

2195

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/801,392	<b>Applicant(s)</b> GARG ET AL.	
	<b>Examiner</b> MENG YAO ZHE	<b>Art Unit</b> 2195	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 May 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

**DETAILED ACTION**

1. Claims 1-22 are presented for examination.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 3-7, 10, 13-17, 19-22 are rejected under 35 U.S.C. 102(e) as being anticipated by Lowell et al., Pub No. 2005/0076324 (hereafter Lowell).

4. Lowell was cited in the previous office action.

5. As per claims 1, Lowell teaches a system comprising:

a processor comprising a hardware virtualization architecture (Para 19, Para 22: the VMM is responsible for hardware virtualization) capable of running virtual machines, the processor having at least two modes of operation, wherein a first processor mode is to run a virtual machine (Para 6; Para 14, lines 2-4; Pg 6, claim 29);

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memory operatively coupled to the processor, the memory storing a virtual management control structure (VMCS) to define authorized access to system resources (Para 6);

a monitor to run in a second processor mode (Para 6);

means for automatically switching from the first processor mode to the second processor mode based on an attempted access of system resources defined in the VMCS (Para 22, lines 25-28; Para 23).

6. As per claims 3, 13, 19, Lowell teaches wherein the monitor is a runtime services monitor (RSM) to execute a runtime service on behalf of a virtual machine, the virtual machine to run in the first processor mode, wherein the RSM is to place results of the runtime service execution in a shared memory location accessible by the virtual machine (Para 33).

7. As per claims 4, 15, 21, Lowell teaches wherein the processor is to run more than one virtual machine (Para 6).

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8. As per claims 5, 14, 20, Lowell teaches wherein the processor is capable of running a first virtual machine simultaneously with a second virtual machine where the virtual machines use different operating systems (Para 1, lines 1-3; Para16).

9. As per claims 6, 7, Lowell teaches wherein the monitor is to access at least one of data and instructions to be protected from the virtual machine (Para 23).

10. As per claims 10, 17, Lowell teaches a method for protecting runtime services, comprising:

attempting access to a system resource by an operating system, wherein the operating system runs in virtual machine execution mode on a processor (Para 6);

automatically switching the processor mode to monitor mode from virtual machine execution mode, in response to the attempted access (Para 22, lines 25-28; Para 23);

accessing the system resource by the monitor ( Para 23, lines 14-17);

switching the processor mode back to virtual machine execution mode from monitor mode (Para 37, lines 8-11; Para 38, lines 21-23).

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11. As per claims 16, 22, Lowell teaches wherein the monitor is a virtual machine monitor having a runtime services monitor component (Para 31).

***Claim Rejections - 35 USC § 103***

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 2, 8, 9, 11, 12, 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lowell et al., Pub No. 2005/0076324 (hereafter Lowell).

14. As per claim 2, Lowell does not specifically teach wherein the first processor mode is Virtual Machine Extension (VMX) mode.

However, it would have been obvious to one having ordinary skill in the art at the time of the applicant's invention to modify the teachings of Lowell with wherein the first processor mode is Virtual Machine Extension (VMX) mode since Lowell teaches that the operating system running on the virtual machine maybe any type of system (Para 16, lines 1-5), which does not exclude Virtual Machine Extension mode.

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15. As per claims 8, 11, 18, Lowell teaches the virtual machine may try to access specific parts of memory that traps to the virtual machine monitor. Lowell does not specifically teach that this special memory may contain a runtime service, wherein the runtime service comprises at least one item selected from the group consisting of code and data.

However, it would have been obvious to one having ordinary skill in the art at the time of the applicant's invention to modify the teachings of Lowell with the special memory containing a runtime service, wherein the runtime service comprises at least one item selected from the group consisting of code and data, since memory is capable of containing anything including code and data.

16. As per claims 9, 12, Lowell teaches the virtual machine may try to access specific parts of memory that traps to the virtual machine monitor. Lowell does not specifically teach that this special memory may contain an address of a function pointer, wherein the function pointer points to the corresponding runtime service.

However, it would have been obvious to one having ordinary skill in the art at the time of the applicant's invention to modify the teachings of Lowell with the special memory containing an address of a function pointer, wherein the function pointer points to the corresponding runtime service, since memory is capable of containing anything including function pointer.

***Response to Arguments***

17. Applicant's arguments filed on 1-22 have been fully considered but are not persuasive.
18. In the remark, the applicant argued that:
- i) Lowell does not teach automatically switching from the first processor mode to the second processor mode based on an attempted access of system resources defined in the VMCS.
  - ii) Lowell does not teach a RSM to execute a runtime service on behalf of a virtual machine, wherein the RSM is to place results of the runtime service execution in a shared memory location accessible by the virtual machine.
19. The Examiner respectfully disagree with the applicant. As to point:
- i) Because the claim is unclear in terms of what a second processor mode is and furthermore, it is even more uncertain what it exactly entails for a system running in two different modes, <i.e. what happens to a processor when it runs a first mode or second mode? Is the first processor mode run in such way that the entire processor is devoted to run a virtual machine, including all its resources, such that the monitor of the second processor mode can not even be on a standby, waiting for interrupts, while the virtual machine is running?>, therefore it is uncertain what physically happens to the processor when it is running in one mode and not the other, so as of result, the Examiner broadly interpret this



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statement to mean that the system has the ability to let a second object run when a first object attempts access of system resource. In Lowell's invention, the first mode corresponds to one of the OS instances, which corresponds to the VMs, which can normally have direct control over the processors in the system (Para 19). However, it is only when the instance access some memory that it is not supposed to, for example when there is no valid translation for it, that is when the VMM, which corresponds to the second mode, takes over and trap the access of interest to itself and takes over from there (Para 22).

ii) The trap and the handler provided by the VMM are all examples of runtime services provided to the OS instance, which corresponds to the virtual machine (Para 23). VMM manipulate various data or requests of interest coming from the OS instance, and afterwards, presents the modified result back to the OS (Para 33).

### ***Conclusion***

20. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MengYao Zhe whose telephone number is 571-272-6946. The examiner can normally be reached on Monday Through Friday, 7:30 - 5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached at 571-272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Li B. Zhen/  
Primary Examiner, Art Unit 2194